**MCA Practice Problems Worksheet #1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

(ratio and proportion and number sense) Name

1. Faye wants to know the height of her school building. On a sunny day, she measures the shadow of the building to be 12 feet. At the same time, she measures the shadow cast by a 5-foot statue to be 2 feet. How tall is her school building?

2. If it takes 7 cups of flour to make 4 loaves of bread, how many cups of flour is needed to make 10 loaves of bread?

3. Out of 248 seniors, 112 are boys. What is the ratio of boys to the number of girls?

4. In 1908, John Herlinger of Austria walked 1400 kilometers from Vienna to Paris on his hands. The journey took 55 days. What was his distance per day?

5. At the local grocery store, 2 pineapples cost $2.78. How much do 7 pineapples cost?

6. Two inches represents 150 miles on a map. The actual distance from Smalltown to Bigtown is 675 miles. In inches, how far apart are the cities on the map?

7. These two triangles are similar. Find the lengths of the missing sides.

30

32.5

5

12

8. If you triple the lengths of the sides of a square, by what factor is the area increased?

9. A dozen eggs sells for $4.20. What is the unit cost per egg?

10. Which costs the least per ounce: a 20 oz. Soda for $0.60, a 68 oz. soda for $2.38, or a 100 oz. soda for $3.32?

11. Tim designs web pages. He charges $500 to start each site, and an additional $50 for every hour needed to keep it updated. If Tim is paid $1000, how many additional hours did he spend keeping it updated?

a. 5 hours b. 10 hours c. 50 hours d. 100 hours

12. The price of a set of tires at Tire Mart is $420.00. One payment plan is to make monthly payments of $39.50 for a year. Customers who choose this payment plan pay interest. What percent of the price of the tires is interest?

e. 8.3% f. 9.4% g. 11.4% h. 12.9%

13. What is the value of ?



a. 11 b. 14 c. 23 d. 59

14. Rosa has to pay the first $100 of her medical expenses each year before she qualifies for her insurance company to begin paying. After paying the $100 “deductible,” her insurance company will pay 80% of her medical expenses. This year her total medical expenses came to $960.00. Which expression below shows how much her insurance company will pay?

e. 0.80(960 – 100) f. 100 + (960÷0.80) g. 960(100 – 0.80) h. 0.80(960 + 100)

15. What is the value of -2m6 ÷ 4m3 when m = -2?

a. -16 b. -4 c. 4 d. 16

16. The animal keeper feeds the monkey 5 pounds of bananas per day. The gorilla eats 4 times as many bananas as the monkey. How many pounds of bananas does the animal keeper need to feed both animals for a week?

e. 25 pounds f. 100 pounds g. 145 pounds h. 175 pounds

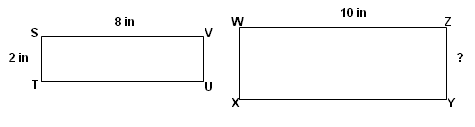
17. An inch worm slithers 8 inches in 3 minutes. How far does the inch worm slither in 5 minutes?

a. 10 inches b. 12 inches c. inches d. inches



18. Rectangles STUV and WXYZ are similar. What is the length of side?





e. 2 inches f. 2.5 inches g. 4 inches h. 4.5 inches

19. Last month the average price for a gallon was $3.25. This month the average

cost is $3.68. Find the percent of increase for a gallon of gas.

1. 13.2%
2. 11.7%
3. 88.3%
4. 43%

20. Carlos ate 1/4 of a cake. Then, Jean ate 1/3 of what was left. When both are done eating, what fraction of the cake is now left?

1. 1/12 b. 5/12 c. 1/2 d. 5/7

21. Which is a cheaper plan for sending an average of 560 text messages per month:

Plan “A” - $7.50 flat fee per month for 400 “free” messages & $0.15 per message after that

Plan “B” - $10.00 flat fee per month for 500 “free” messages & $0.25 per message after that

a. Plan “A” is cheaper by $6.50 b. Plan “A” is cheaper by $18.50

c. Plan “B” is cheaper by $8.50 d. Plan “B” is cheaper by $6.50

22. A cab ride in Minneapolis costs $3.50 for the first 1/4 mile, and $0.30 for each 1/4 mile after that. How much would a 14 mile cab ride cost?

a. $20.00 b. $7.40 c. $20.30 d. $29.60

**MCA Practice Problems Worksheet #2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

(probability and statistics) Name

1. Which type of graph is best for representing the answers to the question, “Who is your favorite teacher?”

a. bar graph b. line graph c. scatter plot d. box & whisker

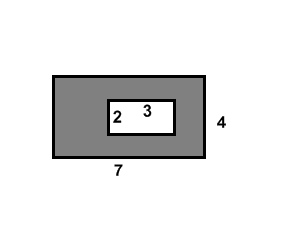
2. How many three-digit codes are possible using the digits 1 through 9 with no limitations?

3. A gumball machine has 45 red gumballs, 35 green gumballs, and 20 blue gumballs. With one coin, what is the probability of getting a gumball that is not blue?

4. Two kids each put coins into the gumball machine from problem #3. What is the probability that the gumballs come out red, then blue?

5. If you flip a coin 5 times, what is the probability of getting all 5 tails?

6. What is the probability of choosing one card from a standard deck and getting an ace or a king?



7. What is the probability of selecting a dot at random in the shaded region?

8. Consuela averaged 16 points per game in her 10 regular season games. She averaged 20 points per game in the 4 playoff games. What was her final average for the season?

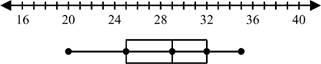
9. When rolling a 6-sided number cube, what is the probability of rolling a number larger than a 1?

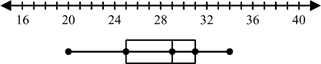
10. How many “code words” are possible using the letters of your first name exactly one time each?

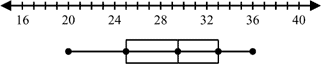
11. Only one of the box-and-whisker plots correctly displays data about the ages of team members on a company baseball team. Use the true statements below to correctly choose the box-and-whisker plot.

* + The youngest member is 20 years old.
  + About 75% of the members are between 25 and 34 years old.
  + No one is older than 34 years old.
  + About 50% of the members are at least 29 years old.

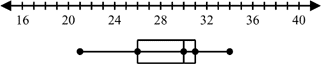
a. b.







c. d.



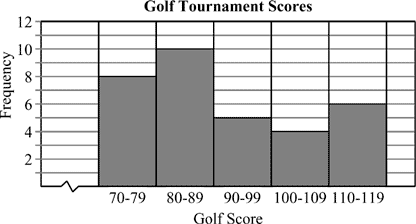
12. Bianca is making homemade cards to send to friends and family and to sell at the local craft fair. This scatter plot shows the total number of cards she had made after each hour she worked on the task.



Using this information, what is the best prediction of the number of cards Bianca can make in 12 hours?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 64 | b. | 39 | c. | 54 | d. | 74 |

13. The scores for the 33 golfers in a golf tournament are represented in the graph below. In which interval is the median score found?



|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 90-99 | b. | 100-109 | c. | 80-89 | d. | 70-79 |

14. Find the median of the set of numbers: 17, 37, 39, 27, 38, 26, 28, 24, 40

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 28 | b. | 30.7 | c. | 23 | d. | 27.2 |

15. Five people are entered in a race. If there are no ties, in how many ways can the first two places come out?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 10 | b. | 20 | c. | 25 | d. | 120 |

16. Choose a marble from a bag holding 10 blue marbles, 7 green marbles, and 9 red marbles. What is the probability that you will choose a red marble?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 0.30 | b. | 0.35 | c. | 0.62 | d. | 0.65 |

17. After the introduction of a new soft drink, a taste test is conducted to see how it is being received. Of those who participated, 48 said they preferred the new soft drink, 112 preferred the old soft drink, and 40 could not tell any difference. What is the probability that a person in this survey, chosen at random, preferred the new soft drink?

a. b. c. d.



18. What is the probability of getting a heads and an odd number when one coin is tossed and one ten-sided die is rolled?

a. b. c. d.



**MCA Practice Problems Worksheet #3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

(algebra) Name

**1**. **Simplify 3x + 2(x – 5)**

a. x – 10 b. 5x + 10 c. 5x – 10 d. 5x – 5

**2.** **Solve the equation 5x + 2 = x + 7**

a. b. c. d.



**3. If 2x – 4(3 – x) = 18 then *x* = ?**

a. – 15 b. – 3 c. 1 d. 5

**4. What are the zeros of the function: y = x2 – x – 6 ?**

a. – 2 and 3 b. and c. 3 and – 5 d. there are no zeroes

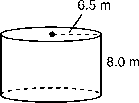


**5. Which point is a solution of the linear system: y = – 2x – 8 and y = x +**



a. (– 3, – 2) b. (– 1, – 6) c. (3, 7) d. (21, – 50)

**6. The volume of a right circular cylinder is V = πr2h. What is the approximate volume of this right circular cylinder?**



a. 265.5 m3 b. 326.7 m3 c. 1036.9 m3 d. 1061.9 m3

**7. Katie is simplifying this expression: 2(5a + 3b – c) – 5(4a – 2b – 3c). Which of the following expressions is equivalent?**

a. -10a + 16b + 13c b. -10a – 4b – 4c c. 30a + b + 2c d. 30a – 4b – 17c

**8. Solve this equation: 3 – 2x = 17**

a. x = 7 b. x = -10 c. x = -7 d. x = 10

**9. Solve this equation: x2 – 6x + 5 = 0**

a. x = -1, -5 b. x = 1, 5 c. x = 2, 3 d. x = -2, -3

**10. Solve this system of equations: y = 4x – 8 and y – 2x = 0**

a. (**–** 4, **–** 8) b. (1, 2) c. (**–** 1, **–** 2) d. (4, 8)

**11. Ralph has borrowed $600 for 2 years at a rate of 5%. Use formula I = Prt to find the total amount of interest he will pay.**

a. $6000 b. $60 c. $660 d. $30

**12. Solve this inequality: – 3x + 6 < – 21**

a. x > 9 b. x < 5 c. x < 9 d. x > 5

**13. Solve this equation: 3(x – 4) = 2(6x + 3)**

a. x =  b. x =  c. x = –2 d. x = 

**8. The volume of a cylinder is given by V = πr2h, where r is the radius of the base and h is the height of the cylinder. Find the height of a cylinder that has a volume of 810π square feet and a radius of 9 feet.**

a. 100 feet b. 10**π** feet c. 90 feet d. 10 feet

**9. Simplify: 3 + 3(4 + 5)3**

a. 4374 b. 149 c. 2190 d. 19, 686

**10. Simplify 7\*7 + 15 – 6 + 2**

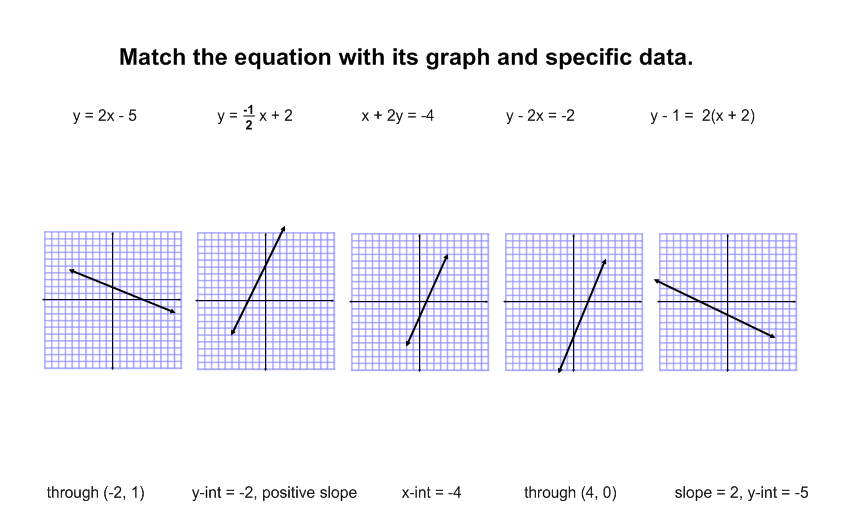
|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 50 | b. | 61 | c. | 53.5 | d. | 29 |

**11. What is the value of  when a = 3 and b = –4?**

a. b. c. d. 1



**12.**



A

B

D

C

E

**MCA Practice Problems Worksheet #4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

(algebra) Name

FIND THE EQUATIONS OF THE FOLLOWING LINES IN PROBLEMS 1 - 5

**1. slope = 4, y-intercept = 3**

a. y = 3x + 4 b. y = 4x – 3 c. y = (4/3)x d. y = 4x + 3

**2. slope = through (2, 6)**

a. y = x + 5 b. y = x + 6 c. y = 5x +  d. y = 2x + 6

**3. Parallel to y = –5x + 8 and a y-intercept of –2**

a. y = –2x + 8 b. y = –5x – 2 c. y = x – 2 d. y = 8x – 2

**4. slope = -4, y-intercept = 0**

a. y = -4 b. y = -4x c. y – 4 = x d. y = x – 4

**5. Perpendicular to 2x – 3y = 12 and through (4, -5)**

a. y = x – 11 b. y = x – 5 c. y = x – 5 d. y = x + 1

**6. Robert is simplifying the expression 2(a + 2b + 3c) + 4(a – 3b + 2c). Which of the following is equivalent**?

a. 6a + 4b + 6c b. 6a + 16b + 14c c. 6a – 8b + 14c d. 12abc

**7. Find the x-intercept of 3x - 5y = 15**

a. x = 3 b. x = -3 c. x = 5 d. x = -5

**8. Find the slope of the line through (-2, 2) and (7, -3).**

a. -5/9 b. -1/5 c. -9/5 d. 3/5

**9. I can rent a truck for a flat rate of $30 plus $12 per hour. Which equation represents the cost of the truck over *h* hours?**

a. C = 30h + 12 b. C = 30 + 12h

c. C = 30(12)h d. C = (30 + 12)h

**10. For the exponential equation y = 5 \* which is true ?**

a. y-intercept = 5; decay b. y-intercept = 1/3 ; decay

c. y-intercept = 1/3 ; growth d. y-intercept = 5 ; growth

**11. What is the equation represented by this data ?**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| x | 1 | 3 | 5 | 7 |
| y | 5 | 1 | -3 | -7 |

a. y = 3x + 2 b. y = -5x + 10 c. y = 4x + 1 d. y = 7 – 2x

**12. What is the complete factored form of 5m2n – 10mn + 15mn2?**

a. 5mn(5m2n – 10mn + 15mn2) b. 5mn(m – 2 + 3n) c. 5m2n(–10mn + 15m2n) d. 5(m2n – 2mn + 3mn2)

**13. Simplify 3(g + 2h) – 2(3g – 4h) + 5(–2g + h)**

a. 0 b. –13g + 3h c. 7g + 19h d. –13g + 19h

**14. Solve –18 = 12 – 3x**

a. x = 2 b. x = –2 c. x = 10 d. x = –10

**15. Four students have tried to solve the equation 3x + 5 = 4 + 2(x + 6). Which is correct?**

a. x = 11 b. x = 21 c. x = 5 d. x = 16/5

**16. Solve x2 – 4 = 0.**

a. x = 4 b. x = 2 or x = –2 c. x = 2 d. x = 4 or x = –4

**17. Solve x2 + 7x = –6**

a. x = 1, x = 6 b. x = 7, x = 6 c. x = –1, x = –6 d. x = –1, x = 6

**18. Solve m2 – 5m – 14 = 0 for m**

a. the solutions are 7 and –2 b. the solutions are –7 and 2 c. the solutions are 0 and –14 d. there are no solutions

**19. Solve the system of equations: y = 3x**

**y = –4x – 7**

a. (1, 3) b. (2, –15) c. (–3, –1) d. (–1, –3)

**20.** **Solve the system of equations: 2x + 3y = 16**

**4x – 3y = 14**

a. (5, –2) b. (2, 5) c. (5, 2) d. (–5, 2)

**21. Solve the following inequality: 3(x – 2) < –9**

a. x > –1 b. x < –5 c. x > –5 d. x < –1

**22. Solve the following inequality: 4x + 7 ≥ 2 + 3(x – 1)**

a. x ≥ –8 b. x ≥ 2 c. x ≤ –8 d. x ≥ 6

**23. The volume of a sphere is given by the formula V =  πr3, where r is the radius of the sphere. Find the approximate volume of a sphere with a diameter of 10 meters, using 3.14 for pi.**

a. 4190 m3 b. 60 m3 c. 520 m3 d. 290 m3

**MCA Practice Problems Worksheet #5 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

(geometry) Name

1. Name 2 pairs of vertical angles in the picture below. 2. Find the missing values in the picture if **∠**1 = 35°

1

4

2

3

A

E

D

B

C

85°

20°

3. Find x if the angles pictured are supplementary 4. Fill in the missing angle values.

2*x* + 8

3*x* + 7

5. Find x and y in the following picture 6. Find x if the angles pictured are complementary

5 + *x*

3*x* − 1

115°

2*x* − 5

5*y* + 10

7. Find all the missing angles in the picture 8. Find the missing angle

52°

46°

B

A

C

28°

35°

*x* + 10

2*x*

2*x* − 5

C

B

A

9. Find the missing angles 10. Find x

1

2

64°

124°

**11.** **Solve for all missing parts of the following right triangles. Use SOHCAHTOA**

A

C

B

40°

6

6

10

b

**a. b.**

c. d. e.

12

a

20**°**

5

c

12

6

c

5

30°

60°

x

y

5

17

28°

45°

b

a

7

f. g. h.

30°

60°

18

c

d

**i. j. k.**

30°

60°

x

12

y

45°



n

q

**Vertical Angles, Alternate Interior Angles, Corresponding Angles**

1

5

2

6

3

7

4

8

**Use the picture to the left to answer the following.**

**∠**1 and **∠**6 are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**∠**2 and **∠**4 are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**∠**3and **∠** 6 are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**∠**5 and **∠**7 are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**∠**4 and **∠**7 are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Find the Areas of the following figures**

a = 4

7m

9.8cm

19.3cm

10”

22”

13”

8”

6”

14 ft

24 ft

15.8m

10”

3”

5”

4”

#### Surface Area

**MCA Practice Problems Worksheet #6 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

(geometry) Name

**Solve the various problems**

**1. Find the area of the circle, the area of the 150°sector 2. Find the volume and the surface area of the box**

**and the length of the arc from A to B**

14”

5”

9”

A

150°

r = 6

B

3**. Find the volume and the surface area of the cone 4. Find the area of the trapezoid**

3’

5’

4’

10cm

12cm

9cm

13cm

15cm

**5. Find the volume and surface area of the sphere 6. Find the volume and surface area of the cylinder**

r = 5”

10m

4m

**7. Find the surface area and volume of the prism 8. Find the volume and the surface area of the pyramid**9. A 25-foot ladder is leaning against a building. The base of the ladder is 7 feet from the base of the building. How high up the building does the ladder reach?

16cm

20cm

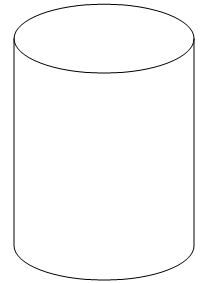
30cm

8’

8’

12’

10. What shape does the vertical cross section of the figure below create?



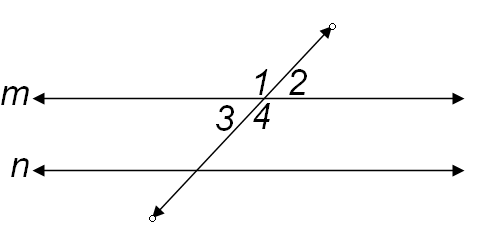
a. circle

b. cylinder

c. rectangle

d. oval

11. In the figure below, the measure of ∠4 is 130°. What is the sum of the measures of ∠2 and ∠3?



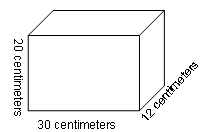
a. 50°

b. 60°

c. 80°

d. 100°

12. Emily needs to make a glass case with the following measurements:



How many square centimeters would it take to construct the case enclosed on all sides?

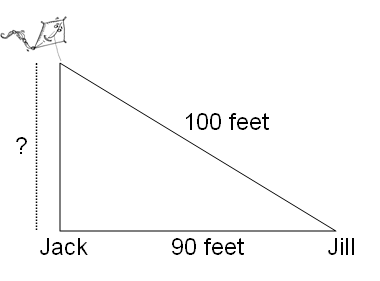
a. 612 square centimeters

b. 2,400 square centimeters

c. 6,200 square centimeters

d. 7,200 square centimeters

13. Jill is flying a kite on 100 feet of string. She holds the end of the kite string to the ground while Jack measures the distance to a point directly under the kite. If the distance from Jill to Jack is 90 feet, how high is the kite above the ground? Answer to the nearest whole foot.



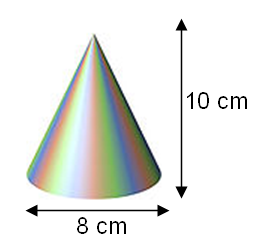
a. 40 feet

b. 42 feet

c. 44 feet

d. 46 feet

14. The cone below has a base with diameter of 8 cm and height of 10 cm.



Use the formula V = πr2h to find the volume of the cone to the nearest cubic centimeter.

(π ≈ 3.14)

a. 42 cm3

b. 167 cm3

c. 503 cm3

d. 670 cm3

**MCA Practice Problems Worksheet #7 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

(probability and stats) Name

**Probability and Data/Statistics Problems**

1. There are 50 students in the school orchestra in the following sections:

25 string section, 15 woodwind, 5 percussion, 5 brass

One student will be chosen at random to present the orchestra director with an award. What is the probability the student will be from the woodwind section?

1. Below is a computer simulation of rolling one six sided cube 50 times.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Outcome | 1 | 2 | 3 | 4 | 5 | 6 |
| Frequency | 8 | 6 | 13 | 11 | 5 | 7 |

1. What is the theoretical probability of rolling a 3 or a 4?
2. Calculate the experimental probability of rolling a 3 or a 4.
3. A company is offering 1 grand prize, 3 second place prizes, and 25 third place prizes based on a random drawing of contest entries. If your entry is one of the 500 total entries, what is the probability you will win a third place prize?
4. A twenty-point quiz is given in algebra. The following list contains the scores of eleven students. Determine if any of the scores are outliers using the definition of an outlier.

An Outlier is a value which lies 1.5 times the inter-quartile range above the third quartile or below the first quartile.

4, 8, 9, 10, 11, 11, 11, 12, 13, 16, 20

1. The frequency chart gives the hourly wage of the employees at BigTop Burgers. Find the mean hourly wage.

|  |  |
| --- | --- |
| **Wage** | **Frequency** |
| $7.50 | 5 |
| $7.90 | 10 |
| $8.30 | 8 |
| $9.70 | 7 |
| $15.80 | 1 |

$7.90 b) $8.60 c) $8.30 d) $9.84

1. What measure of central tendency is most affected by an outlier?

mode b) mean c) median d) standard deviation

1. In a basketball contest, each player will attempt 3 free-throws. If a Sam has a 70% chance of making each free-throw, what is the probability of Sam making exactly 2 out of 3 free-throws?
2. 0.666 b) 0.147 c) 0.21 d) 0.441
3. The weather forecast calls for a 25% chance of rain each day for the next four days. Find the probability that it will rain 3 out of the 4 days.
4. 0.047 b) 0.188 c) 0.012 d) 0.75
5. What is the probability that if a family has 3 children they are all boys? Assume the probability of having a boy = 1/2

a) 0.333 b) 0.125 c) 0.375 d) 0.25

1. Which value will change the most if the outlier is omitted from the data set below?

0 10 11 12 12 12 13 13 14 14 15 16

A. IQR B. Mean C. Median D. Mode

4

1. Between which two variables would you expect to find a high correlation, but not causation?

A: x – number of hours studying B. x – score on a physics test

y – score on a math test y – score on a chemistry test

C. x – number of hours worked D. x – number of CDs purchased

y - amount of paycheck y – total amount spent

1. As a decimal, what is the largest the value of the probability of an event occurring?
2. Use the box and whisker plot to answer the questions below.

0 8 16 24 32 40 48 56

a.What is the Q1 value?

A. 2 B. 8 C. 36 D. 42

b. 50% of data the values are above what value?

A. 8 B. 24 C. 32 D. 38

1. What is the IQR?
2. What is the median?
3. What is the Q3 value?
4. What is the highest number in the sample?
5. A survey shows that 85% of the registered voters in the Centennial School district voted in the last election. Of those who voted, 54% voted to pass the school levy. What is the probability that a registered voter chosen at random voted to pass the school levy?

A. .310 B. .459 C. .540 D. .629

1. There is a 40% chance of rain today and a 20% chance of rain tomorrow. There is a 10% chance it will rain both days. What is the probability that it will rain today *or* tomorrow?

A. 10% B. 30% C. 40% D. 50%

1. Examine the following two data sets:

**Set #1**:49, 55, 68, 72, 98

**Set #2**: 26, 56, 57, 75, 82, 89

Which of the following statements is true?

A. They have the same mode. B. They have the same median

C. They have the same mean. D. None of the above is true.

1. Which measure will change the most if the outlier is omitted from the data set shown below?

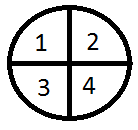
{0,10,11,12,12,12,13,13,14,14,15,16}

1. IQR B. Mean C. Median C. Mode

**18.** Using the data in the table at right, answer the following

|  |  |
| --- | --- |
| Age | Frequency |
| 8 | 1 |
| 10 | 3 |
| 14 | 2 |
| 16 | 1 |
| 17 | 2 |

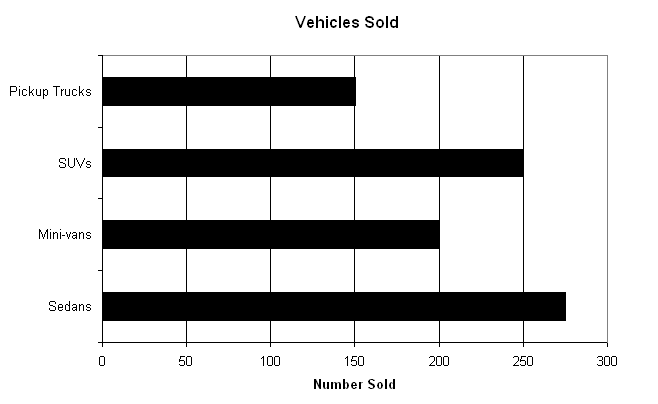
1. mean age = median age
2. mean age > median age
3. mean age < median age



1. mean age < mode age

**19.**  What is the probability of rolling a 5 on a six sided die and spinning 4 on the spinner at right?

**20.** Out of a group of 16 students 6 are to be chosen to serve as peer tutors in algebra. A group of 7 seniors, 5 juniors, and 4 sophomores have volunteered to be tutors. If the students are chosen at random, what is the probability that 2 seniors, 2 juniors, and 2 sophomores will be selected?



**21**. Paul constructed a bar graph showing the number of

each of four types of vehicles sold at Sunshine Motors last year.

Approximately how many more sedans and mini-vans were

sold than SUVs and pickup trucks?

a. 25 b. 50

c. 75 d. 100

**EXTRA MATERIAL**

**Day 5: Number Sense Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Solve each proportion. Show your cross product!**

**1) = 2) = 3) = 4) =**

|  |  |
| --- | --- |
| **Hamburger** | **5 pounds for $11.95** |
| **Bread** | **3 loaves for $8.97** |
| **Soup** | **6 cans for $7.50** |
| **Apples** | **$6.60 per dozen** |

**The following chart shows the prices in**

**a weekly advertisement.**

**5) Find the Unit Price for each item.**

**Hamburger in price per pound = \_\_\_\_\_\_\_\_\_\_\_ Bread in price per loaf = \_\_\_\_\_\_\_\_\_\_\_**

**Soup in price per can = \_\_\_\_\_\_\_\_\_\_\_ Apples in price per apple = \_\_\_\_\_\_\_\_\_**

**6) If the unit price of a granola bar is $0.65 per bar,**

**find the cost of a box of 8 bars. \_\_\_\_\_\_\_\_\_\_\_\_**

**7) The school purchases oranges to sell in the lunchroom. The cost of one dozen oranges is $7.08. The school sells the oranges for $0.75 each. How much money does the lunch program profit on the sale of 200 oranges?**

**(Hint: Find the unit cost of an orange – cost to school.)**

**8) I traveled 155 miles and used 8 gallons of gasoline. Find fuel efficiency of my car in miles per gallon.**

**9) In a survey of 50 students, 12 brought their own lunch. How many students would you predict would bring their own lunch if there are 2,346 students in school?**

**10) A recipe calls for 3 cups of flour to make 5 dozen cookies. I need to make 36 dozen cookies. How many cups of flour will I need?**

**11) The price of the bicycle I want to buy is $465.00. It is on sale at 25% off the price. Find the new cost of the bicycle.**

**12) Jake makes a salary of $150 per week. He earns 15% commission on his total sales each week. If his sales totaled $794.85 last week, find his total earnings last week.**

**13) Last week Kelsey earned $150. This week she earned $195. Find the rate of change in her income from last week to this week. Is it an increase or a decrease?**

**14) Yesterday the lunchroom sold 452 slushies. Today they sold 367 slushies. Find the rate of change in the sale of slushies. Is it an increase or a decrease?**

**15) Answer the following based on the following rectangles.**

**8 ft**

**16 ft**

**14 ft**

**28 ft**

**What is the scale factor (ratio) of the lengths of the rectangles? \_\_\_\_\_\_\_\_\_\_**

**What is the scale factor of the widths of the rectangles? \_\_\_\_\_\_\_\_\_\_\_**

**How are the rectangles related?**

**Find the perimeters of each. Small: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Large: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Find the ratio of the perimeter of the small to the large rectangle.**

**Find the areas of each. Small: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Large: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Find the ratio of the area of the small to the large rectangle.**

**Day 5 Practice Problems**

1. **Which expression is equivalent to 5(m + 2n) – (3m + 4n)?**
2. **2m + 14n b) 8m + 14n**
3. **2m – 14n d) 2m + 6n**
4. **Find the product of (2.4 x 108)(4.3 x 10-5).**
5. **1.032 x 10-40 b) 1.032 x 103 c) 1.032 x 104 d) 1.032 x 1013**
6. **Simplify: (-5x3) (2x4)**
7. **-10x12 b) -3x12 c) -10x7 d) 10x7**
8. **Multiply: 3x3(4x2 + 2x – 5)**
9. **12x5 + 6x4 – 15x3 b) 7x5 + 5x4 – 8x3 c) 12x6 + 6x4 – 15x3 d) 7x6 + 5x3 – 8x3**
10. **Divide:**
11. **8x3 + 4x b) 3x6 + 2x5 c) 3x3 + 4x d) 3x3 + 2x**
12. **Find the product of (x + 6)(x – 4).**
13. **x2 – 10x – 24 b) x2 – 2x – 24 c) x2 + 2x – 10 d) x2 + 2x – 24**
14. **Which of the following is the equation of a line containing points (3, 6) and (-1, 4)?**
15. **y = ½ x + 4 b) y = 2x + 0 c) y = ½ x + 4.5 d) y = - ½ x + 6**
16. **Factor completely the following:**
17. **15x3y2 – 20x2y b) 8x4 – 12x2 + 4x c) x2 + 8x + 12**
18. **Simplify the following:**
19. **(3x5)(-4x2) b) (2x3y2)3 c) (-4x3)2 (-2x4)3**
20. **Solve the linear equation 3x – 2y = 12 for y. (Place in y = mx + b form!)**
21. **Solve the linear equation 5x + 4y = 20 for y.**

|  |  |
| --- | --- |
| **Day (*n)*** | **Mass (g)** |
| 0 | 1 |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |

\_\_\_\_\_ 9. What is the *x****-***intercept of the following linear equation?

3*x* + 4*y* = 12

* 1. (0, 3)
  2. (3, 0)
  3. (0, 4)
  4. (4, 0)

\_\_\_\_\_ 10. A scientist wants to determine the half-life of iodine-131 experimentally.

He started with 1 gram of iodine-131 and recorded its mass. His results are shown in

the table at right.

If *n* represents the day, which of the following functions can be used to determine its mass?

a. f(*n) =* 2n

b. f(*n*) = *n*



c. f(*n*) = 2*n*



d. f(*n*) =



11. Nicole works as an assistant pharmacist. She is paid $9.40 per hour for the first 40 hours per week with time-and-a-half for overtime. Which expression would be used to determine her salary if she works 43 hours?

a.  *s* = $9.40(40) + 0.5(3)

b. *s* = $9.40 + 1.5($9.40)(3)

c. s *=* $9.40(43) + 1.5($9.40)(3)

d. *s* = $9.40(3)

12. The regular price of a stereo *(r)* is $560. The stereo is on sale for 25% off. Which equation will help you find the sale price (*s*) of the stereo?

a.  *s*  = *r* – 0.25

b. *s*  = *r* – 0.25*s*

c. *s*  = *r* – 0.25*r*

d. *s*  = *r* – *s*

13. Which of the following is the graph of the equation *y = x +* 2?

|  |  |
| --- | --- |
| a. |  |
| b. |  |
| c. |  |
| d. |  |

14. Which of these is the equation of the line that generalizes the table of values below?

|  |  |
| --- | --- |
| **x** | **y** |
| 0 | 2 |
| 1 | 5 |
| 3 | 11 |
| 7 | 23 |

a. *y* = 2

b*. x =* 3*y +* 2

c. *y =* 3*x* + 2

d. y = 7x + 23

15. Katie is simplifying this expression: 2(5*a* + 3*b* – c) – 5(4*a* – 2*b* – 3*c*). Which of the following expressions is equivalent?

a. -10*a* + 16*b* + 13*c*

b. -10*a* – 4*b* – 4*c*

c. 30*a* + *b* + 2*c*

d. 30*a* – 4*b* – 17*c*

16. Four students have attempted to simplify a mathematical expression. They have four different answers. Which of the answers below is equivalent to the expression?

2(a + 3b) – 4(3a – b) – (5a + 4b)

a. -15a + 6b

b. -17a + 9b

c. -9a – 2b

d. -9a + 9b

17. What is the equation of the line that includes the point (4, -3) and has a slope of -2?

a. y = -2x – 5

b. y = -3x – 2

c. y = -2x + 5

d. y = 2x – 5

18. Solve the following inequality: -3(4x + 5) > (5x + 6) + 13

a. x < -f



b. x < -2

c. x >



d. x > 2

19. Solve a2 + 5a – 14 = 0 for a.

a. The solutions are 2 and -7.

b. The solutions are -2 and 7.

c. The solutions are -2 and -7.

d. The solutions are 2 and 7.

20. Which is the solution of the following system of equations?

y = 4x – 8

y = 2x

a. (-4. -8)

b. (4, 8)

c. (-1. -2)

d. (1, 2)

21. Consider the following equations:

f(x) = 3x + 2 and f(x) = 3x – 7

Which of the following statements is true concerning the graphs of these equations?

a. The graphs of the equations are lines that are perpendicular to each other

b. The graph of the line represented by the equation f(x) = 3x + 2 always remains above the axis,

while the graph of the line represented by the equation f(x) = 3x – 7 always remains below the

axis.

c. The graphs of the equations are lines that are parallel to each other, but that have different

y-intercepts.

d. The graphs of the lines intersect each other at the point (2, -7).

22. Ralph has borrowed $600 for 2 years at annual rate of 5%. Use the formula I = PRT to find the amount of interest he will pay.

a. $15

b. $24

c. $60

d. $150

23. If you wanted to show the continuous growth of a population over time, which type of graph would you use?

a. line graph

b. circle graph

c. histogram

d. bar graph

24. Which of the following charts would be most useful in predicting height as a function of finger length?

|  |  |
| --- | --- |
| a. |  |
| b. |  |
| c. |  |
| d. |  |

26. Examine the following two data sets:

Set #1:49, 55, 68, 72, 98

Set #2: 26, 56, 57, 75, 82, 89

Which of the following statements is true?

a. They have the same mode.

b. They have the same median

c. They have the same mean.

d. None of the above is true.

27. Five friends studied together for the math test. They got an average of 87% on the test. April scored 92%, Beth got 79%, Carol earned 88%, and Dani got 90%. What was Elaina’s score?

a. 85% b. 86% c. 87% d. 88%

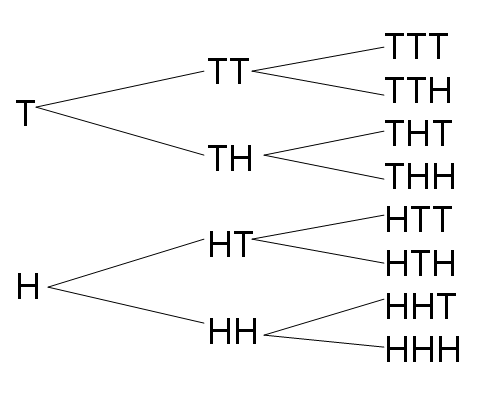
28. Eddie averaged 14 points per game in the 12 regular season games. He averaged 22 points per game in the 3 tournament games. What is Eddie’s overall average?

a. 15.6 points per game b. 18.0 points per game c 19.5 points per game d. 20.2 points per game

29. How many different 3 letter patterns can be formed using one A, one B and one C?

a. 4 b. 6 c. 9 d. 27

30. Use the tree diagram to predict the probability of flipping one coin 3 times and getting one head and two tails.

.

a. b. c. d. 3



31. In a family of 4 children, what is the probability that all four will be girls?

a. b. c. d.



32. Sarah deposits $0.50 into Miss Clucky, a machine which gives Sarah one plastic egg with a toy surprise. In the machine, 30 eggs contain a rubber frog, 43 eggs contain a plastic ring, 23 eggs contain a necklace, and 18 eggs contain a plastic car. What is the probability that Miss Clucky will give Sarah a necklace in her egg?

a. b. c. d.



\_\_\_\_\_ 40. Which of the following choices is the best estimate for the width of a standard door?

a. 9 meters

b. 9 kilometers

c. 90 centimeters

d. 90 millimeters

4. A salesperson makes a base salary of $3000 per month. After she sells 50 scanners, she earns 30% of the cost of each additional $200 scanner she sells. If she sells 175 scanners in one year, which expression represents her total annual wages?

1. $3000 + (.30)(200)(175 - 50)
2. 12($3000 + (.30)(200)(175 - 50))
3. $3000 \* 12 + (.30)(200)(175 - 50)
4. 0.30(3000 \* 12 + 200 \* (175 – 50))

5. Sarina purchased a new car with a special 0% interest rate. She placed a $2000 down payment on the car, and will pay $446.50 per month on her remaining balance. If the car cost $18050, how many months will it take her to pay off her loan completely?

1. 40
2. 32



1. 36
2. she’ll never pay it off

6. The triangles below are similar. What is the value of *x*?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 3.1 | b. | 93.5 | c. | 24.9 | d. | 99 |

7. A map has a scale of  If the actual distance between the two cities is 448 miles, how far apart are they on the map?

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 8 inches | b. | 16 inches | c. | 32 inches | d. | 64 inches |

8. On January 1, Mario had a savings account balance of $2742 and by April 1, his balance had increased to $3597. Find Mario's average savings rate in dollars per month for that period.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | $ 213.75 | b. | $ 285.00 | c. | $ 855.00 | d. | $ 1199.00 |

9. Estimate the grade received on a test when 28 questions are answered correctly out of 40.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| a. | 70% | b. | 143% | c. | 43% | d. | 30% |

HELPFUL HINTS for the MCA test in MATH

**ALGEBRA**

1. Simplifying Expressions – use the distributive property (Watch out for subtraction!)

4(x – 2y) – (3x – 5y) = 4x – 8y – 3x + 5y = 1x – 3y

2. Adding Terms – add LIKE terms (x’s to x’s, y’s to y’s, etc. – leave exponents alone)

4x + 3 – 8y + 7x – 8 + 4y = 11x – 4y – 5

3. Multiplying Terms – add exponents on variables

(3m2n3)(–2mn4) = –6m3n7

4. Solving Equations in One Variable – get x by itself on one side

PLUG ANSWERS INTO ORIGINAL EQUATION!!

5. Solving Quadratic (x2) Equations – graph, factor, or quadratic formula

PLUG ANSWERS INTO ORIGINAL EQUATION!!

6. Solving Systems of Equations – substitute or eliminate

y = 3x 3x – y = 0

y = 2x – 4 –2x + y = –4

substitute 3x = 2x – 4 add them 1x = –4

solve x = –4 substitute 3(–4) – y = 0

plug in y = 3(–4) = –12 –12 – y = 0

y = –12

PLUG ANSWERS INTO ORIGINAL EQUATIONS!!

7. Equations of Lines

y= mx + b m = slope; b = y-intercept 

Parallel lines have same slope

Perpendicular lines have slopes that are negative reciprocals

8. Exponential Growth & Decay – repeated multiplication

 *a* is the y-intercept

If b is > 1, GROWTH

If b < 1, DECAY

NUMBER SENSE

**1. Calculator Use**

1. Fractions – does your calculator have a fraction key? If not, MATH-FRAC
2. Negative Numbers – use parentheses as needed
3. Roots – where is the square root or cube root key?
4. Powers – squared, cubed, 4th power, etc. – can you key in?

**2. Order of Operations**

1. **PEMDAS** – **P**arentheses, **E**xponents, **M**ultiplication/**D**ivision, **A**ddition/**S**ubtraction (from left-to-right each step)
2. Graphing calculator can handle the order; some scientific calculators cannot

**3. Applications of Decimals and Fractions**

1. **Read each problem *carefully***
2. Break down the information
3. Watch out for different units in problem! (minutes vs. hours)
4. Eliminate answers that don’t look right at all

**4. Percent Problems**

# IS / OF = % / 100

1. **Percent change = (amount of change) / (*original* amount)**

**5. Rate, Ratio & Proportion** **(fraction = fraction; cross-multiply to solve)**

1. *Keep the matching units in the same parts of the fractions*

For example, either  =  or  = 

1. Map Scales (inch / mile) = (inch / mile)
2. Similar Figures (match corresponding sides in proportion)
3. Unit Pricing (cost per item)

DATA, STATISTICS & PROBABILITY

**1. Central Tendency & Variability**

1. Mean – add numbers up and divide by how many there are
2. Median – put numbers in order and find the one in the middle
3. Mode – number that occurs most often
4. Range – max value minus min value
5. IQR – range of middle 50% of data (length of box)

**2. Line of Best Fit** – plot the points in a scatter plot; use best fit line to predict

**3. Interpreting Graphs**

A. Scatter Plot – plot points without connecting – use best fit line

B. Line Plot – continuous plot over time – connect each point

C. Bar Graph – words on x-axis; height of bar tells how many in category

D. Histogram – range of numbers on x-axis; height of bar tells how many in each range

E. Circle Graph – pieces of pie shown by percentage of 360 degrees

F. Stem and Leaf Plot – arrange numbers in order, stacked in bars

G. Box and Whisker Plot – shows range of each 25% of data items

**4. Probability**

1. Sample Space – count the total possibilities
2. Computing Probabilities – always a fraction between 0 and 1

C. Permutations & Combinations – order matters for a permutation

D. Independent vs. Dependent Events – does one affect the choices for next?

1. Trees – show all possibilities
2. Union & Intersection – union is OR; intersection is AND
3. Binomial Models – success or failure – what are probabilities of each?
4. Area Probability – find area of smaller region; divide by area of total

Online Practice

MCA Sampler: Pdf with answers Pioneer Press Sample Questions Pioneer Press Answers Really good slides









QUIZLET flash card review Texas Sample Test



